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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/524,972	02/18/2005	Christel Renate Schopfer	13173-00007-US	1455
23416 7590 04/19/2007 CONNOLLY BOVE LODGE & HUTZ, LLP P O BOX 2207 WILMINGTON, DE 19899			EXAMINER KALLIS, RUSSELL	
			ART UNIT	PAPER NUMBER
			1638	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
31 DAYS	04/19/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

10/524,972

Applicant(s)

SCHOPFER ET AL.

Examiner

Russell Kallis

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 February 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-100 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) \_\_\_\_\_ is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-100 are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Election/Restrictions*

Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 1-3, 5, 12-15, 21-23, 27, 29-30, 60-62, 86-87 and 90-99, drawn to methods of modifying ketolase expression in plants encompassing non-transgenic methods and the plants thereof.

Group II, claim(s) 1-100, drawn to methods of modifying ketolase expression in plants by transformation with ketolase encoding polynucleotides and transgenic plants thereof; and nucleic acid constructs.

The inventions listed as Groups I-III do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the special technical feature of a method of manipulating ketocarotenoids by culturing a genetically modified plant was taught in the art. Mann *et al.* Nature Biotechnology; Vol. 18, August 2000 pp. 888-892 teach metabolic engineering of tobacco to express a ketolase (crtO) from an ocean alga that resulted in the production of ketocarotenoids in the nectaries of transformed tobacco flowers; and that the petals of marigold are an attractive host plant for production of ketocarotenoids by metabolic engineering because of the large sink capacity of Marigold petals for producing and storing ketocarotenoids such as astaxanthin in their natural conformation (see abstract and page 890 beginning in column 2 the entire Discussion).

The claims are directed to independent and distinct nucleic acid and amino acid sequences of Groups i, ii, A to N; and O to R. Upon election of Group II, Applicant is required to elect one nucleic acid/amino acid Group of either Group i) or ii); **two** nucleic acid/amino acid

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Groups from Groups A to N; one group from Groups O, P, Q, or R; and one from Groups S, T, U or V. This requirement is not to be construed as a requirement for an election of species, since each of the Groups of nucleic acid/amino acid sequences or cassettes/constructs is not a member of a single structurally and functionally related genus, but rather constitutes an independent and patentably distinct invention. Separate searches and considerations would be required for examination of each of the nucleic acid sequences.

- i) ketolase SEQ ID NO: 1-2, and a  $\beta$ -hydroxylase and  $\beta$ -cyclase,
- ii) ketolase SEQ ID NO: 15-16, and a  $\beta$ -hydroxylase and  $\beta$ -cyclase;
- A) HMG-CoA reductase SEQ ID NO: 99-100,
- B) (E)-4-hydroxy-3-methylbut-2-enyl-diphosphate reductase SEQ ID NO: 101-102,
- C) 1-deoxy-D-xylose-5-phosphate synthase SEQ ID NO: 103-104,
- D) 1-deoxy-D-xylose-5-phosphate reductoisomerase SEQ ID NO: 105-106,
- E) isopentyl-diphosphate delta-isomerase SEQ ID NO: 107-108,
- F) geranyl-diphosphate synthase SEQ ID NO: 110 and (109 or 106),
- G) farnesyl-diphosphate synthase SEQ ID NO: 111-112,
- H) geranylgeranyl diphosphate synthase SEQ ID NO: 113-114,
- I) phytoene synthase SEQ ID NO: 115-116,
- J) phytoene desaturase SEQ ID NO: 117-118,
- K) zeta-carotene desaturase SEQ ID NO: 119-120,
- L) crtISO SEQ ID NO: 121-122,
- M) FtsZ SEQ ID NO: 123-124,

- N) MinD SEQ ID NO: 215-126;
- O) endogenous beta hydroxylase RNA antisense, sense, or ds expression cassette,
- P) endogenous beta hydroxylase DNA or protein binding factor expression cassette,
- Q) viral endogenous beta hydroxylase degradation expression cassette,
- R) one of an endogenous beta hydroxylase insertion, deletion, inversion or mutation construct;
- S) endogenous beta hydroxylase RNA antisense, sense, or ds expression cassette,
- T) endogenous beta hydroxylase DNA or protein binding factor expression cassette,
- U) viral endogenous beta hydroxylase degradation expression cassette,
- V) one of an endogenous beta hydroxylase insertion, deletion, inversion or mutation construct;

Claims 1-3, 5, 12-15, 21-23, 27, 29-30, 60-62, 86-87 and 90-99 are generic to Groups I and II and will be examined to the extent they read upon the elected Group of either a non-transgenic plant or a transgenic plant.

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a species or invention to be examined even though the requirement be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected invention.

The election of an invention or species may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse.

Should applicant traverse on the ground that the inventions or species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions or species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

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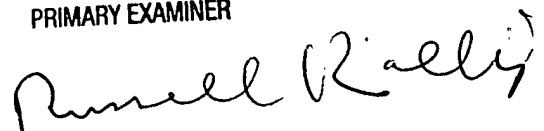
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Russell Kallis whose telephone number is (571) 272-0798. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anne Marie Grunberg can be reached on (571) 272-0975. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Russell Kallis Ph.D.  
April 9, 2007

RUSSELL P. KALLIS, PH.D.  
PRIMARY EXAMINER

A handwritten signature in black ink that reads "Russell Kallis". The signature is written in a cursive, flowing style.